**Note-taking  
Worksheet****Exploring Space**

22B

**Section 1 Radiation from Space**

A. Electromagnetic waves—carry \_\_\_\_\_ through space and matter

1. \_\_\_\_\_ radiation includes radio waves, visible light, gamma rays, X rays, ultraviolet light, infrared waves, and microwaves.
2. \_\_\_\_\_—electromagnetic radiation arranged by wavelength
  - a. Forms of electromagnetic radiation differ in their \_\_\_\_\_, or in the number of times waves vibrate per unit of time.
  - b. The \_\_\_\_\_ the wavelength, the more vibrations that will occur.
3. All electromagnetic waves travel at speed of \_\_\_\_\_, or 300,000 km/s.

B. Optical telescopes—use light to produce magnified images

1. \_\_\_\_\_ **telescopes**—have convex lenses
2. \_\_\_\_\_ **telescopes**—use concave mirror
3. Optical telescopes are often located in buildings called \_\_\_\_\_, which often have roofs that can be opened for viewing.
4. The *Hubble Space Telescope* is located outside \_\_\_\_\_ atmosphere.
  - a. Mistake made in shaping largest \_\_\_\_\_.
  - b. Once the mistake was repaired, the *Hubble Telescope* sent back images of a large cluster of \_\_\_\_\_.
5. \_\_\_\_\_ optics—computer helps correct poor images.
6. \_\_\_\_\_ optics—laser relays information to computer to adjust telescope's mirror and make images clearer.

C. A \_\_\_\_\_ **telescope**—studies radio waves that travel through space

1. Because radio waves pass freely through atmosphere, radio telescopes are usually useful \_\_\_\_\_ hours a day.
2. Scientists use information from radio waves to detect objects in space, map the \_\_\_\_\_, and look for signs of life on other planets.

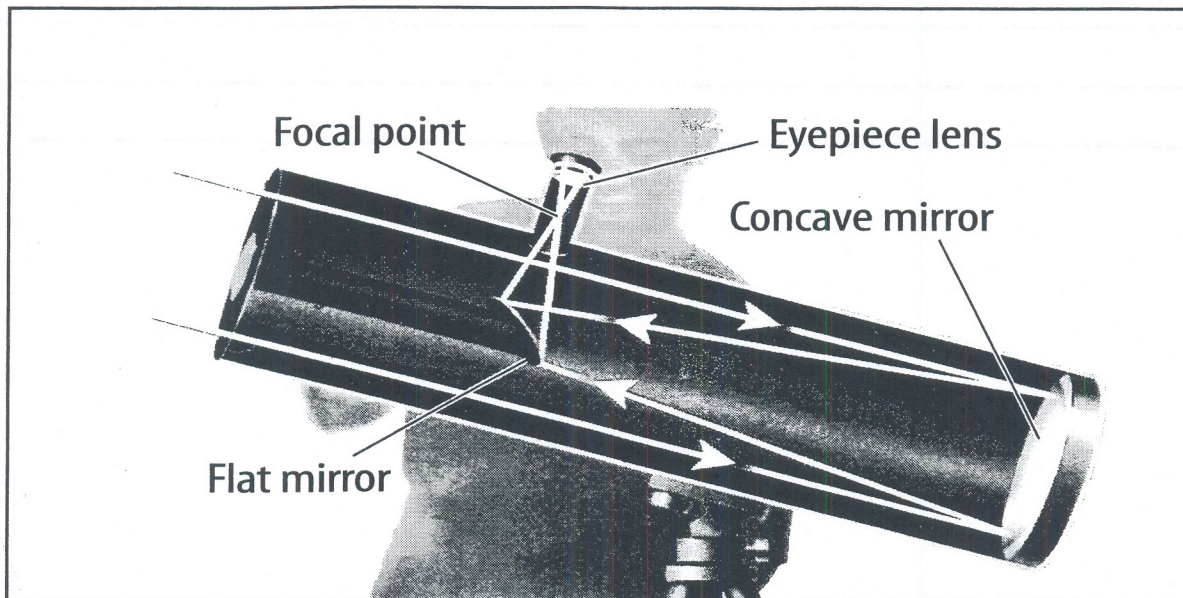
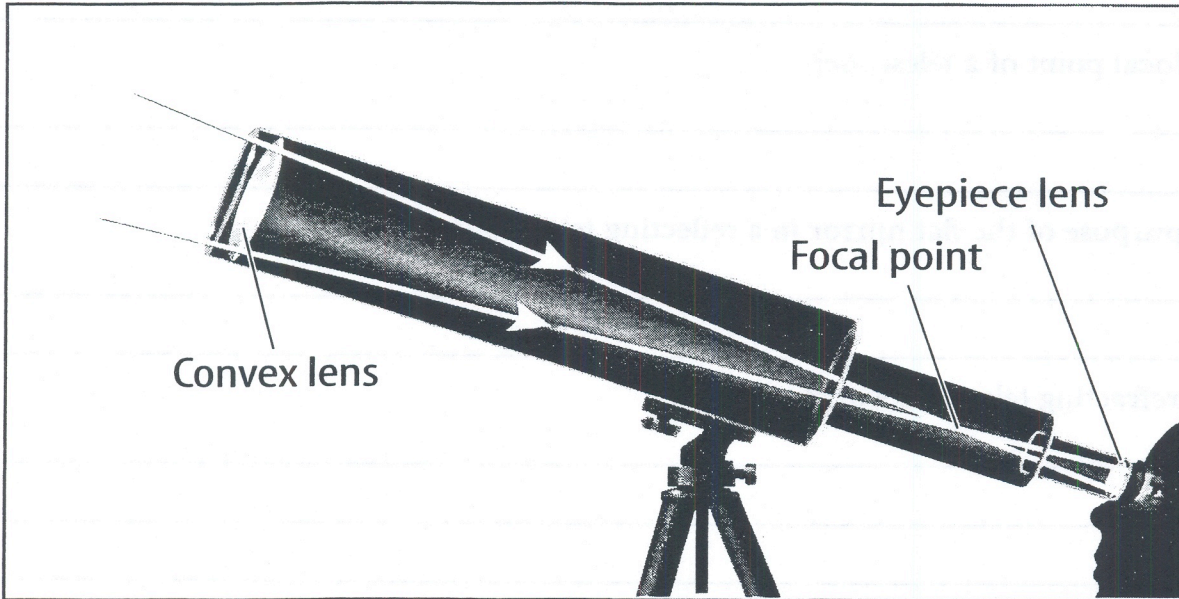
**Note-taking Worksheet (continued)****Section 3 Current and Future Space Missions**

- A. \_\_\_\_\_—reusable spacecraft for transporting people, satellites, and other materials to and from space
1. Launched standing on \_\_\_\_\_
  2. Glides back to Earth like an \_\_\_\_\_
- B. \_\_\_\_\_—permanent places in space for humans to live and work
1. U.S. \_\_\_\_\_ orbited Earth from 1973 to 1979.
    - a. Crews performed experiments and collected data on the effects of living in \_\_\_\_\_.
    - b. Fell out of \_\_\_\_\_ and burned up as it entered Earth's atmosphere
  2. Former Soviet Union \_\_\_\_\_ housed one cosmonaut for more than a year at a time.
    - a. Crews from the former Soviet Union and American crews worked together aboard the *Mir*.
    - b. Crews from the former Soviet Union spent more time aboard *Mir* than crews from any other country.
- C. The United States and Russia have \_\_\_\_\_ in nine joint space missions.
1. \_\_\_\_\_ (ISS)—cooperation and resources of 16 countries
  2. ISS to be completed by 2006.
- D. Several missions explore \_\_\_\_\_.
1. \_\_\_\_\_ *Surveyor* and *Mars Pathfinder*—scientists learned water may have covered planet in the past.
  2. In 2002, \_\_\_\_\_ confirmed that Martian soil contained frozen water.
- E. \_\_\_\_\_ (NMP)—purpose is to create advanced technology that will let NASA send smart spacecraft into the solar system
- F. \_\_\_\_\_—*Lunar Prospector* mapped the Moon's structure and composition.
1. Scientists wanted to know if water existed in craters at the Moon's poles.
  2. Because no material was thrown up when *Lunar* \_\_\_\_\_ was ordered to crash, more studies needed.
- G. Space probe \_\_\_\_\_ will explore Saturn and its largest moon Titan.
- H. The \_\_\_\_\_ *Space Telescope* will study star and galaxy processes.
- I. Many people have \_\_\_\_\_ from research and technology developed for the space program.

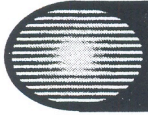


**SECTION**  
**1****Teaching Transparency**  
**Activity****Telescopes**

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# Assessment Transparency Activity

## Exploring Space

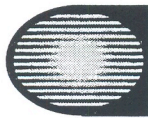
45

**Directions:** Carefully review the table and answer the following questions.

U.S. Space Missions			
Date	Mission	Duration (hours: minutes)	Notable "Firsts"
1961	Mercury 3	0:15	U.S. citizen in space
1962	Mercury 6	4:55	U.S. citizen to orbit Earth
1965	Gemini 6A	25:51	Spacecrafts connected in orbit
1968	Apollo 7	260:09	Orbit of the Moon
1969	Apollo 11	195:18	Human on the Moon
1983	Challenger	146:24	U.S. woman in space

- According to the table, the first human on the Moon was part of space mission \_\_\_\_.  
 A Mercury  
 B Gemini  
 C Apollo 7  
 D Apollo 11
- According to this information, which space mission lasted less than one hour?  
 F Mercury 3  
 G Mercury 6  
 H Gemini 6A  
 J Apollo 7
- According to the table, how long was it between the time the first U.S. citizen went into space and the time the first U.S. woman went into space?  
 A 1 year  
 B 21 years  
 C 22 years  
 D 32 years





Directed Reading for  
Content Mastery

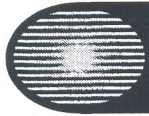
**Key Terms**  
**Exploring Space**

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**Directions:** Complete the sentences using the terms listed below.

	<b>satellite</b>	<b>space probe</b>	<b>reflecting</b>
<b>refracting</b>		<b>Mars</b>	<b>Sputnik I</b>
<b>observatory</b>		<b>spectrum</b>	<b>orbit</b>
	<b>space station</b>	<b>space shuttle</b>	<b>Project Gemini</b>
		<b>rocket</b>	
		<b>Project Apollo</b>	

- Any object that revolves around another object is a(n) \_\_\_\_\_.
- A(n) \_\_\_\_\_ telescope uses mirrors to focus light.
- The curved path that a satellite follows is a(n) \_\_\_\_\_.
- \_\_\_\_\_ was the last stage in the American effort to land people on the Moon.
- A(n) \_\_\_\_\_ telescope uses a double convex lens to focus light.
- The \_\_\_\_\_ is a reusable spacecraft that transports astronauts, satellites, and other materials to and from space.
- A(n) \_\_\_\_\_ is an instrument that gathers information and sends it back to Earth.
- During \_\_\_\_\_ teams of astronauts orbited Earth to practice skills that would be needed to land on the moon.
- A(n) \_\_\_\_\_ is a building that houses an optical telescope.
- The different forms of radiation arranged according to their wavelengths is called the electromagnetic \_\_\_\_\_.
- A(n) \_\_\_\_\_ is an engine that burns fuel without requiring air.
- Mir* is an example of a \_\_\_\_\_.
- The first artificial satellite was \_\_\_\_\_.
- Viking I was the first spacecraft to land on \_\_\_\_\_.



## Chapter Review

# Exploring Space

27

### Part A. Vocabulary Review

**Directions:** Use the following words to fill in the blanks below.

electromagnetic spectrum

orbit

rockets

Project Gemini

reflecting telescopes

space shuttle

refracting telescopes

Project Apollo

observatories

space station

satellite

Cassini

space probes

radio telescopes

Project Mercury

- \_\_\_\_\_ 1. Most optical telescopes used by professional astronomers are housed in \_\_\_\_\_.
- \_\_\_\_\_ 2. The path of a satellite around Earth is called its \_\_\_\_\_.
- \_\_\_\_\_ 3. \_\_\_\_\_ was the final stage of the space program to reach the Moon.
- \_\_\_\_\_ 4. Any object that orbits Earth is a \_\_\_\_\_.
- \_\_\_\_\_ 5. The space probe \_\_\_\_\_ was launched in October 1997 to study Saturn.
- \_\_\_\_\_ 6. The \_\_\_\_\_ is the arrangement of electromagnetic waves according to wavelengths.
- \_\_\_\_\_ 7. As part of \_\_\_\_\_, John Glenn became the first American to orbit Earth.
- \_\_\_\_\_ 8. Cosmonauts spent 365 days living and working in their \_\_\_\_\_ *Mir*.
- \_\_\_\_\_ 9. Optical telescopes that use concave mirrors to focus light from objects are \_\_\_\_\_.
- \_\_\_\_\_ 10. The *Voyagers* were \_\_\_\_\_ that traveled beyond our solar system.
- \_\_\_\_\_ 11. Scientists use \_\_\_\_\_ to study radio waves traveling through space.
- \_\_\_\_\_ 12. A goal of \_\_\_\_\_ was to have two spacecraft hook up together while in orbit.
- \_\_\_\_\_ 13. The \_\_\_\_\_ is a reusable spacecraft that glides back to Earth after it leaves orbit.
- \_\_\_\_\_ 14. Reflecting telescopes and \_\_\_\_\_ are two types of optical telescopes.
- \_\_\_\_\_ 15. \_\_\_\_\_ are motors that don't require air to burn fuel.